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# Batrachians from Cameroon collected by Dr. Y. Sjöstedt in the years 1890—1892.

By

L. GABR. ANDERSSON.

With 1 plate and 1 figure in the text.

Communicated April 12th by Hj. Théel and E. Lönnberg.

The rich and very well preserved collection of batrachians brought home in 1892 from Cameroon by Professor Y. Sjöstedt and at present kept in the zoological museum of Gothenburg, was placed at my disposal through the kindness of the late director of this museum Dr. A. Stuxberg and my friend Mr. J. Sjöstedt, to whom I want to express my great gratitude.

The collection contains 203 specimens representing 24 species, three of which seem to me to be new. Preliminarily I have described them in a paper: "*Neue Batrachier aus Kamerun von den Herren Dr. Y. Sjöstedt und Dr. R. Jungner gesammelt*" in Verhandl. d. k.-k. zool. botan. Gesellsch. in Wien. 1903, p. 141, and now giving the figures I repeat the descriptions as well, in order to have figures and descriptions in the same place.

Beside these three new species I have also established a new form of the genus *Arthroleptis*, which, for the present, I have placed as a variety of *A. variabilis* Matschie, though perhaps it ought to be regarded as a distinct species.

In the list of the 24 true species *Hylambates brevirostris* Werner is not counted, represented in the collection by three

specimens. On grounds mentioned in the following I do not consider it a distinct species, placing it instead as a variety of *Hylambates rufus*.

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## Rana subsigillata A. Dum.

BOULENGER. *Proc. Zool. Soc. London 1890, p. 437.*

Though of about similar size, the two specimens, which are to be found in the collection, show, however, a distinct difference in colour, the somewhat larger one having still retained his juvenile dress, described by BOULENGER in the paper quoted above, while the other appears in the adult stage with a thin brown network on the lower light parts. The former specimen is a male, the latter probably a female, but on account of the bad state of the specimen I am not able to ascertain it. The male one has a rather indistinct oval gland on the thighs, not to be found in the supposed female. BOULENGER speaks about a similar gland, which he observed »in some specimens», but does not mention it as a difference between the sexes, which is probably the case.

The tongue differs rather much in the specimens, the male having a broad hind margin with the two pointed lobes, existing in all species of the genus *Rana*, far distant from each other and a small third in the space between, while in the other specimen the tongue is oval, becoming narrower behind, causing the two lobes nearly to touch each other in the median line.

This difference in such an important character as the shape of the tongue seems to be rather peculiar, but may be only individual; in all other respects, however, except the above mentioned differences, due to age and sex, the two specimens agree completely, as will be seen by the following measurements.

| | mm. | mm. |
|---|---|---|
| Length of body from nose to vent | 37 ♂ | 39 ♀ ? |
| » » femur | 16 | 16 |
| » » tibia | 15 | 15 |
| » » tarsus with 3d toe | 25 | 25.8 |
| » » » without 3d toe | 9.2 | 9 |
| From the ellbow to the point of the 3d finger | 15 | 14.8 |
| » » » of the 1st finger | 13 | 12.8 |
| Length of 1st finger | 6.4 | 6.1 |
| Breadth of head at the angle of the mouth | 14.8 | 14.8 |
| Length of lower jaw | 16.8 | 17 |
| Length of head from the hind margin of tympanum | 15 | 16 |
| » » » » eye | 11 | 11.2 |
| Longitudinal diameter of eye | 5.1 | 5 |
| Length of snout | 6.7 | 6.3 |
| Distance between eye and nostril | 3.2 | 3.4 |
| » » » » tympanum | 5.2 | 6 |
| Diameter of tympanum | 3 | 3.1 |

## Rana æquiplicata Werner.

Werner. *Verhandl. zool. bot. Gesellsch.* Wien. Bd. 48. 1898, p. 192.
Boulenger. *Proc. Zool. Soc.* London, 1900, p. 437.

13 specimens, 20—40 mm. in length.

This form has first been established by Werner as a variety of *Rana mascareniensis* and Boulenger has afterwards in paper quoted fixed it to be a distinct species on account of "the more numerous interrupted folds and the more extensively webbed toes". Though being of indisputable value, I would not consider these characters good enough to give a right to pronounce the two forms distinct *species*, judging by these characters only, wherefore I have now further compared them, carefully examining these examples as well as a great number of both *Rana æquiplicata* and *R. mascareniensis*, borrowed from the Royal Museum in Stockholm. By this examination it appeared, that, beside the differences mentioned above, there are also others, and among these one at least, viz. the quite different development of

the hind limbs, that ought to be in my opinion a very important one, on account of which I am no longer in doubt that *Rana æquiplicata* is a good distinct species.

Its chief character is still the numerous irregularly placed short dorsal folds, by which we are able, generally at the first glance, to distinguish it from *Rana mascareniensis*. If the folds, as sometimes happens, are few and long as in *R. mascareniensis*, there is, however, always one or another short one, especially on the anterior part of the back, that is never to be found in the latter.

The other character, given by BOULENGER, seems not to be of so good a value, but on a strict examination it also proves quite constant, though there is a great variation in both forms, on account of which, in this case, there are a great deal of individuals connecting the species.

On the 1st toe in *R. æquiplicata* the web reaches at least the base of the distal phalanx but sometimes over it; in *R. mascareniensis* it usually ends beyond that one, though it may sometimes appear as a narrow fold as far as the last joint. On the 2nd toe the web of the inner edge extends in both species to the base of the penultimate phalanx, whereas at the outer edge this toe in *R. æquiplicata* is webbed nearly to the tip of the terminal phalanx but in *R. mascareniensis* never farther than to its base and sometimes not so far. On the 3rd toe we find in *æquiplicata* the web of the inner edge reaching the penultimate joint, sometimes passing it somewhat, on the outer side out on the terminal phalanx but sometimes only to its base, in *R. mascareniensis* the web always ends at the mentioned articulations, in its extremity sometimes traced only as a very narrow fold. On the 4th toe the web at both the edges in *æquiplicata* usually extends to the middle of the penultimate phalanx, sometimes only to the base of it, but sometimes also as far as the distal articulation, in *mascareniensis*, on the contrary, the two last phalanges and sometimes also to some extent the third one are free from web. On the 5th toe lastly the web in *R. æquiplicata* passes the distal articulation out on the terminal phalanx, while in *R. mascareniensis* it never reaches over its base.

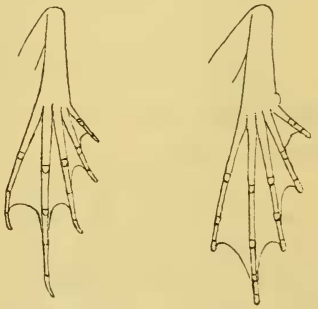
A very good difference between the species is, as mentioned above, the different development of the hind limbs, especially that of the foot, a character distinctly visible

through the following table, showing the average measurements of the different parts of the hind limb in percentage of the length of the body.

| | R. æquiplicata | R. mascareniensis |
|---|---|---|
| | mm. | mm. |
| Total length | 42 | 42.6 |
| Length of the thigh in % of that of the body | 61.1 | 57.1 |
| Length of the tibia in % of that of the body | 69.7 | 62.2 |
| Length of the tarsus in % of that of the body | 32.7 | 31.2 |
| Length of the foot with 4th toe in % of that of the body | 60.0 | 64.2 |
| Length of the foot in % of that of the hind limb (the foot excepted) | 36.8 | 42.7 |

The average measurements in this table are based on 12 specimens of *R. æquiplicata* and 12 of *R. mascareniensis*, varying in length from 35 mm. to 56 mm., in both species as much as possible representing the same stages of development. All the specimens measured are from West-Africa.

Looking at the table we find that in *Rana æquiplicata* the thigh and the tibia are very much longer than in *R. mascareniensis* while the foot is considerably shorter, differences well marked by the different average measurements of length of foot in % of that of other parts of limb (viz. 36,8 and 42.7). It ought to be expressed as follows: *In Rana æquiplicata the foot with the 4th toe does not come up to 40 % of the rest of the limb* (in specimens measured varying between 34,3 and 39,2), *in R. mascareniensis this measurement is more than 40 %* (in specimens measured varying between 41,3 and 45,1).



R. mascareniensis R. æquiplicata

The present figures show the typical shape of the foot in the two species. The slender toes with their acuminate tips and deeply emarginated web in *R. mascareniensis* give this foot quite another appearance than the foot of *R. æqui-*

*plicata* with its broad and blunt toes and slightly notched membrane, which reaches as far as the tips of the toes.

The table below, giving average measurements in other respects as well, shows that the difference in length we find in the 4th toe of the two species does not exist in the other toes. Further, it appears that also the front limbs are more developed in *R. æquiplicata*, as also the nose is longer, the eyes greater, and the head broader than in *R. mascareniensis*. Briefly, *Rana æquiplicata* is a stronger and stouter form than *R. mascareniensis*.

| | R. æquiplicata | R. mascareniensis |
|---|---|---|
| | mm. | mm. |
| Total length | 42 | 42.6 |
| Length of 1st toe in % of that of body | 14.2 | 14.7 |
| Length of 2d toe in % of that of body | 26.5 | 26.3 |
| Length of 3rd toe in % of that of body | 44.5 | 42.9 |
| Length of 5th toe in % of that of body | 44.5 | 44.9 |
| Length of humerus in % of that of body | 24.0 | 21 4 |
| Length of forearm in % of that of body | 45.4 | 42.9 |
| Distance of tympanum from tip of the nose in % of length of body | 32.2 | 30 |
| Diameter of eye in % of length of body | 12.5 | 11.8 |
| Breadth of head in % of length of body | 32.9 | 31.8 |

The colour is also different at least in these west-african examples, the groundcolour in *R. æquiplicata* being much more light brown than in *R. mascareniensis*, where it is more greyish black.

A comparison between differently-sized specimens of *R. æquiplicata* (of *R. mascareniensis* I could not get any young examples) shows, as appears by the following table, that there exists in some respects a great difference between the juvenile and the adult stage. The extremities are considerably shorter in the young ones, but the nose and the eyes as well are longer, while the breadth of the head is nearly the same in all specimens. The web is also less developed in young specimens than in adult ones.

Furthermore, in the juvenile state the throat and the chin are bright chocolate coloured with an white median line and light markings on the margin of the lower lip; most pro-

minent is this colour in the smallest examples (those measuring 20 and 21 mm. in length); in other small specimens (reaching 28 mm.), I had at my disposal, the brown colour had begun to fade and change into white: in two specimens it had already completely disappeared except some more or less distinct spots between the bases of the fore limbs.

**Rana æquiplicata** (average table).

| | 12 specimens betw. 20 and 28 mm. | 12 specimens betw. 39 and 55 mm. |
|---|---|---|
| Total length (in mm.) . . . . . | 24.3 | 42 |
| Length of thigh in % of that of body . . . | 49.8 | 61.1 |
| » » tibia » » » . . . | 57.3 | 69.7 |
| » » tarsus » » » . . . | 29.4 | 32.7 |
| » » 4th toe » » » . . . | 47.2 | 60 |
| » » 1st » » » » . . . | 11.6 | 14.2 |
| » » 2d » » » » . . . | 21.7 | 26.5 |
| » » 3d » » » » . . . | 34.3 | 44.5 |
| » » 5th » » » » . . . | 32.9 | 44.5 |
| » » humerus » » » . . . | 21.8 | 24 |
| » » forearm with hand in % of that of body . . . . . | 45.4 | 45.4 |
| Distance of tympanum from tip of the nose in % of that of body . . . . . | 35.0 | 32.2 |
| Diameter of eye in % of that of body . . . | 15.3 | 12.5 |
| Breadth of the head » » » . . . | 33 | 32.9 |

## Rana albolabris Hallow.

Among the eight specimens in this collection there is only one male, all the others are females. Besides I had two specimens, kindly lent to me from the Royal Museum in Stockholm, even these being females, a fact that seems to show that this sex should be much more numerous, but it may also be that the males keep to a more hidden life, though I do not think it very probable.

To state some constant differences between the sexes upon only one male must be rather insufficient, but to judge by this single example, the males differ from the females, be-

sides by the glands on the fore limbs, by longer snouts and longer hind limbs, being the same differences we find between young and old females. Thus, all the small females have longer snouts and longer hind limbs than the large ones, except one very large female that seems to have begun to lose her female characters, obtaining instead those of the males (a long snout and long hind limbs).

The following table will prove the correctness of the above:

| | 5 females (36—60 mm. in length) | 3 females (60—66 mm. in length) | 1 female (81 mm.) | 1 male (51.5 mm.) |
|---|---|---|---|---|
| Length of the snout in % of the length of the body . . . | 17.4 (18.3—16.5) | 16.4 (16.8—15.9) | 18 | 19 |
| Length of the hind limbs in % of the length of the body | 156 (159—154) | 146.5 (149—142) | 176 | 167 |
| Length of the fore limbs in % of the length of the body | 74.1[1] (76.7—71) | 72.8 (73.8—72) | 76 | 74 |

In this table I also give the average measurements of the length of the fore limbs, also these, though much less evident, showing the same course of development as the hind limbs. Any sexual difference is not to be found here. the measurement of the male being completely the same as in similarly sized females.

The colour varies considerably; the back being brown, brownish-gray, olive coloured, or even light gray usually with some rather indistinct dark spots. The lateral glands are often pure white but also sometimes dusky-coloured; the lower light parts are in some specimens clouded with brown or gray; the hind limbs more or less distinctly black-barred. As BOULENGER remarks, the white on the upper lip disappears in the largest specimens but may be also wanting in some middle-sized examples. There is no difference in colour between the male specimen and the females to be detected.

[1] In this number the measurement from the smallest specimen is ot counted, being so exceptionally low (68).

## Chiromantis lepus. L. G. Andersson.

Pl. I, fig. 1, 1 a.

*Verh. d. K. K. zool. botan. Gesellsch. in Wien 1903, pag. 142.*

»Gaumenzähne in zwei deutlichen, nach hinten konvergierenden Haufen zwischen der Choanen. Kopf flach, länger als breit. Schnauze vorn abgestumpft, länger als das Auge. Canthus rostralis markiert, Frenalgegend konkav, longitudinal, Nasenloch viel näher der Schnauzenspitze als dem Auge. Trommelfell sehr deutlich, kreisrund, im Durchmesser halb so gross als das Auge. Zunge herzförmig, ausgeschnitten. Finger zu zwei und zwei gruppiert, die äusseren an der Basis verwachsen; an einigen Fingern keine Spur von Schwimmhaut vorhanden. Haftscheiben derselben wohl entwickelt, aber kleiner als das Trommelfell. Hintere Extremitäten sehr long. Tibiotarsalgelenk reicht über die Schnauzenspitze hinaus. Auch die Zehen sehr lang, alle durch vollständige Schwimmhäute vereinigt. Haftscheiben klein, Subartikulartuberkel deutlich. Ein deutlicher Tuberkel an der Innenseite des Metatarsus. Oberseite des Körpers fein granuliert, Gliedmassen und Unterseite des Körpers glatt, mit Ausnahme der hintersten Partie des Bauches und der Subanalgegend, die granuliert sind.

Oberseite des Körpers und Kopfes olivenblau, welche Farbe an der Seiten von einem breiten braunen Bande begrenzt ist, das sich von der Schnauzenspitze über das Auge und Trommelfell bis an die hinteren Extremitäten erstreckt. Unterseite des Körpers und Kopfes weiss, ungefleckt; die Seiten lichtblau mit braunschwarzen Flecken. Gliedmassen oben und an den Seiten gelblichbraun mit dunkleren Flecken, unten weisslich.

Körperlänge 53,5 mm. Totallänge der hinteren Extremitäten 102 mm. Länge eines Fusses mit vierten Zehe 32 mm. Totallänge des Vorderschenkels 42 mm., Schnauze 9 mm. Kopfbreite hinter den Augen 16 mm. Länge des Kopfes (vom hinteren Rande des Trommelfelles bis zur Schnauzenspitze) 20,2 mm.

Das Exemplar scheint mir eine typische Chiromantis-Art zu sein, ist aber von den schon beschriebenen Spezies die-

ser Gattung hauptsächlich durch vollständigen Mangel der Schwimmhaut an den Vorderfüssen und die sehr langen Hinterbeine gut getrennt, wie auch die Zeichnung und fein chagrinierte Oberseite nicht mit bekannten Arten übereinstimmt.»

To this preliminary description of this new species I only want to add, together with the figure, some measurements for a comparison between this one and *Chiromantis rufescens*, of which species there are to be found four specimens in the collection.

| | Ch. rufescens[1] | Ch. lepus |
|---|---|---|
| Total length in mm. . . . . | 54—55 | 54 |
| Length of nose in % of that of body . . . . . | 16.1 | 16.7 |
| Diameter of eye » » . . . . . | 11.1 | 11.3 |
| Distance of the hind margin of tympanum to the point of nose in % of that of body . . | 30.9 | 37 |
| Breadth of head » » . . | 27.5 | 29.6 |
| Length of thigh » » . . | 42.9 | 44.8 |
| » » tibia » » . . | 45.2 | 56.1 |
| » » tarsus » » . . | 24.6 | 31.1 |
| » » 4th toe » » . . | 34.3 | 59.3 |
| Total length of hind limb » » . . | 140.7 | 190.6 |
| Length of fore limb » » . . | 60.1 | 77.8 |
| Longest finger measured from the angel between 2d and 3d finger in % of that of body . . . | 20.9 | 30 |

As shown by the table, there exists a remarkable difference in the length of the extremities; especially the tibia and the foot with the 4th toe are in *Ch. lepus* exceedingly prolonged; but also the front limbs and the fingers are of a considerable length in comparison with those of *Ch. rufescens*. The distance between the tip of the nose and the hind margin of the tympanum is, as shown above, much greater in *Ch. lepus*, being due as well to the much larger tympanum of this form, the diameter of which comes up to 4 mm. whilst in *Ch. rufescens* it only measures 2,4, 2,8 and 3 mm., as also to its place further back from the eye.

[1] 3 specimens measured.

## Chiromantis rufescens Gntr.

Four specimens; one 24 mm. in length, three 54—55 mm. See the preceeding species!

## Petropedetes cameronensis Reich. and Petropedetes newtoni Bocage.

Of *Petropedetes newtoni* there are in the collection three specimens, two males and one female, and of *P. cameronensis* but one example, a female. Beside those I had for comparison a specimen, also a female, of the third species *P. jonstoni*, lent to me from the Royal Museum.

Of the table below appears that the male of *P. newtoni* has longer limbs than the female; moreover, as previously shown by other authors, the tympanum of the male is considerably larger and provided with a central dermal horn. The large glands on the thighs at the male are absolutely wanting in the female specimens.

| | P. newtoni | | P. cameronensis | P. jonstoni |
|---|---|---|---|---|
| | 2 ♂ | 1 ♀ | 1 ♀ | 1 ♀ |
| Length of body (in mm.) . . . . . | 37[1] | 42.5 | 34 | 24 |
| » of thigh in % of that of body . | 54.1 | 51.8 | 57.6 | 56.2 |
| » of tibia » » » . . | 62.2 | 57.6 | 62.6 | 61.7 |
| » of tarsus with 4th toe in % of that of body . . . . . | 82.5 | 76.5 | 83.8 | 83.3 |
| Length of humerus in % of that of body | 25.6 | 21.2 | 20.6 | 20.8 |
| » of forearm with hand in % of that of body . . . . . | 55.4 | 51.8 | 54.4 | 54.2 |
| Length of nose in % of that of body . . | 16.8 | 17.2 | 17.6 | 19.6 |
| Diameter of eye » » » . . | 14 | 14.1 | 14.1 | 15.8 |
| » of tympanum in % of that of body | 10.8 | 7.1 | 5.9 | 5 |
| Breadth of head in % of that of body . | 42 | 39.5 | 37.6 | 33.3 |

## Phrynobatrachus plicatus Gntr.

21 specimens, 14 males and 7 females.

They agree completely with BOULENGER's description and figure of *Phrynobatrachus auritus* in Proc. Zool. Soc. 1900, p.

[1] Each specimen is 37 mm. in length.

440 but also with statements given on the older form *Phr. plicatus* Gntr. In fact a comparison between the descriptions of the two forms shows that the only difference of any value would be that the tympanum should be distinct in *Phr. auritus* but hidden in *Phr. plicatus*. The tympanum, however, seems in this case to be of slight importance as distinguishing character, being considerably varying at least in all these individuals. While in some examples absolutely invisible it is in others well distinct with well marked margins limited from the surrounding skin. Thus, with the same right as BOULENGER distinguishes *Phr. auritus* from *Phr. plicatus*, I could declare these individuals to be two distinct species, which, however, is quite impossible as in this case there are all sorts of individual variations and the specimens in other respects completely agree with each other.

The only difference, however, beside that of the tympanum I am able to find in the descriptions of the species mentioned may be that »the interorbital space is narrower than the upper eyelid» in *auritus*, but a little broader» in *plicatus*, a rather slight and valueless specific distinction. Generally the interorbital space in these specimens is narrower than the upper eyelid, thus a character which ought to range them under forma *auritus*, but there are also specimens in which this space is at least equal in breadth to that of the eyelid, and having observed this fact we are not far from the next step »a little broader».

Thus, my opinion is that BOULENGER'S *Phr. auritus* is quite the same as GÜNTHER'S *Phr. plicatus*, on account of which I give the specimens this older name, although in every respect they agree with the description of *Phr. auritus*.

In both species mentioned the toes are stated to be two-thirds webbed, which is the case also in these specimens, though the membrane as a very slight fold extends as far as the disks. Looking at BOULENGER'S figure of *Phr. auritus* we find quite the same.

Finally, regarding the colour, it varies considerably, in manner described by the authors. The distinct black small spots on the pelvic region and the white median line, spoken of by BOULENGER, exist in a few specimens. Any constant difference in colour between male and female cannot be stated. In some of the males the throat is more or less black but

in many entirely light-coloured as in most of the females, of which only one has the throat marked with small brown spots.

An external distinction between the sexes that seems to be constant is, however, several longitudinal folds on the sides of throat of the males, which are absent in the females, a distinction clearly depending on the presence of vocable sacs in the former.

Moreover, in both the sexes we find small pinhead-like tubercles on the throat, being especially in some males very distinct. In a few, however, both of males and females these tubercles are but slightly visible.

Except above mentioned sexual distinction there are no such to be found; on the contrary, as shown by the average table, the sexes are very much alike in respects examined.

All the specimens are nearly of the same size, the length of the body varying between 30 and 35 mm. Only one, a female, is as small as 22 mm.

| | 6 males | 5 females |
|---|---|---|
| Total length | 30—33 mm. | 30—35 mm. |
| Length of thigh in % of that of body | 48.8 | 49.4 |
| » tibia » » | 58.2 | 58.1 |
| » tarsus with 4th toe in % of that of the body | 80.6 | 78.6 |
| » fore limb in % of that of body | 67.2 | 68.8 |
| » nose » » | 15.3 | 14.9 |
| Diameter of eye » « | 13.4 | 13.8 |
| Breadth of head » » | 31.8 | 32 |

## Arthroleptis.

Among 39 specimens which in this collection belong to this genus three or possibly four species are represented, namely *A. variabilis* Matschie, *A. macrodactylus* Boul., and *A. calcaratus* Peters. A fourth form, represented by two specimens, does not quite agree with any description of *Arthroleptis*-species, I have been able to find out in literature; but on the other hand, the differences being in my thought not sufficiently great to establish a new species, I have ranged it under *A. variabilis* as varietas *tuberosa*.

The majority of the specimens, no less than 34 examples, belong to the species *A. variabilis*, previously known to be common in Cameroon. The varying appearence of this form, mentioned by PETERS[1], MATSCHIE[2], and WERNER[3] is very well marked also in this collection, there being all sorts of differences in coloration.

As to the variety *tuberosa*, it differs from the typical form by having the skin on the back covered with well marked tubercles, having a stronger and stouter structure, besides by a longer nose and and longer limbs at least to judge from these two specimens. However, in none of the 15 variabilis-specimens I measured, the length of the nose was more than 14,2 % of the length of the body, while in this form this measurement was 15,3 and 15,4.

Possibly, on grounds mentioned, these specimens ought to be distinguished as a species apart, and if the different appearence of the skin on the back proved to be so valuable a character as most authors consider, there would be no doubt of this; but according to my opinion too much stress has been laid upon this character, as far as this genus is concerned. I owe this opinion to the fact that in one or another of the typical variabilis-specimens there are some small tubercles, slightly visible, but still present, but especially to the statement made below for the two specimens of *A. macrodactylus*, the one having distinct tubercles, the other being totally in want of such. Moreover, the differences we find in the measurements are based only on two small probably young specimens and therefore perhaps not be paid too much regard to. As I do not like without weighty reasons to establish any new species of this genus, being in some respects already divided in too many species, and there is no other described to which this form shows a greater resemblance than to *A. variabilis* I put it, as mentioned before, as a variety of this one.

The diagnosis of it would then be as follows:

*Differs from the typical form in the following points: Skin on the upper parts of body and extremities covered with distinct larger and smaller longitudinal warts, body stronger and stouter,*

[1] Monatsb. d. K. Akad. Wiss., Berlin 1875, p. 210 (A. dispar).
[2] Sitzber. d. Ges. naturf. Fr. Berlin 1890, p. 173.
[3] Verhandl. d. zool. bot. Gesellsch. Wien 1898. Bd. 48, p. 193.

*limbs and nose longer, the latter being about 15 % of the length of the body, whilst in the typical form its highest percentage is 14. The colour* (at least in these two specimens) *brown with feebly developed dark markings along the middle of the back; a dark spot above the tympanum; limbs cross-barred; beneath uniform light.*

There is however another species, *A. poecilonotus* Peters, with which this form just as well might be connected, and with which I identified it at first on account of the key of examination in BOULENGER'S *Catalogue of Batrachia*. »Toes very sligtly webbed, nearly free, skin with tubercles or warts above, a single metatarsal tubercle, and a fold along the sides of the body» are all characters which we find in these two specimens. A closer study of the descriptions of the two species, *A. variabilis* and *A. poecilonotus*, however, made me doubtful about their being distinct species. A lateral fold is very prominent also in many variabilis-specimens, and as regards the different appearence of the dorsal skin, this one, according to PETERS [1], in *A. poecilonotus* »erscheint im Allgemeinen glatt», only on a closer examination »sieht man zerstreute kleine Granula».

What remains there then as structural difference between the two species, and how are we able to distinguish the south-african *A. wahlbergii* from these ones? Those are questions that may be decided by a future revision of the genus *Arthroleptis*.

*Arthroleptis macrodactylus*, first described by BOULENGER in Batr. sal. p. 117 and characterized by its very long third finger, is represented in this collection by two specimens. In both the third finger is exceedingly long, a condition which, as appears by the table below, to some extent may be said to exist elsewhere in the fore limbs as well, but in other respects the two specimens show a rather different external appearence, the colour being different and, as mentioned before, the one having distinct tubercles on the back, the other being quite smooth.

According to previously given descriptions the species *A. macrodactylus* is characterized by *smooth* skin, wherefore one of these specimens ought not to be reckoned as belonging

[1] Akademie d. Wissensch. Berlin 1863. Bd. 28. p. 446.

to this species, to which however the peculiarly lengthened finger evidently assigns it, if we do not want to establish two species, recognized by this character, specifically distinct only by the colour and the different appearance of the skin. In length of extremities and other external characters there are no differences to be detected.

Of the third species, *A. calcaratus* Peters, there is one single small example, which very well agrees with descriptions previously given. The light belly is provided with a few well marked round dark-brown spots.

The average table below shows that the forms examined, apart from what has already been said, stand very near to each other. A comparison between old and young specimens of *A. variabilis* does not exhibit either any remarkable differences due to ages. The thighs, however, seem to increase in length with age, while, on the contrary, other parts of limbs perhaps decrease somewhat. Moreover, the head appears to be broader and the eye smaller with increasing age.

| | *Arthroleptis variabilis* | | | *A. macrodactylus* | *A. calcaratus* |
|---|---|---|---|---|---|
| | forma typica | | f. tuberosa | | |
| Length of body in mm . . | 37—34 | 27—17 | 21—23 | 24—25 | 20 |
| | 6 specimens | 9 specimens | 2 specimens | 2 specimens | 1 specimen |
| Length of femur in % of that of body . . . . . | 52.1 | 45.7 | 49 | 45.7 | 44.5 |
| Length of tibia in % of that of body . . . . . | 51.1 | 51.7 | 53.7 | 48.7 | 50.5 |
| Length of tarsus with 4th toe in % of that of body . . | 75 | 77 | 78.4 | 73 | 71.7 |
| Length of humerus in % of that of body . . . . . | 23.5 | 22.4 | 22.6 | 26.4 | 21.7 |
| From elbow to the point of 3d finger in % of that of body | 51.6 | 52.7 | 54.8 | 69 | 50.5 |
| Length of nose in % of that of body . . . . . | 13.1 | 13.5 | 15.3 | 15.4 | 14.1 |
| Diameter of eye in % of that of body . . . . . | 14.2 | 16.8 | 17.9 | 15.7 | 19.2 |
| Breadth of head in % of that of body . . . . . | 37.3 | 32.2 | 36.4 | 33.8 | 34.3 |

## Rappia ocellata Gntr.

3 specimens. 26—27 mm. in length.

## Rappia acutirostris Ptrs et Buch.

Peters et Buchholtz. *Monatsber. Akad. Wissensch. Berlin* 1875, p. 207, pl. II fig. 4. Werner. *Verhand. d. k. k. zool. bot. Gesellsch. Wien* 1898. Bd. 48, pg. 194.

One specimen, 26 mm. from nose to vent.

The specimen agrees completely with Peter's description, but differs from his figure having the dark markings between the eye and on the sacral region with very distinct limits, which are darker than their centres; on the figure quoted the limits are rather indistinct. Furthermore, the narrow dark stripes on the tibia are replaced by a single very broad black-edged crossband; beside this there is a transverse dark spot on the tarso-metatarsal articulation. Yet, I believe the specimen belongs to this species.

Measurements: *Total length 26 mm., femur 13,3 mm., tibia 14 mm., tarsus with 4th toe 19 mm., humerus 5,9 mm., forearm with longest finger 12,1 mm., nose 3,8 mm., diameter of eye 4,2 mm., breadth of head 9 mm.*

## Rappia platyceps Boul.

*Proc. Zool. Soc. London 1900. Part III, pag. 444, pl. 27. 4.*

A single small specimen, probably belonging to this species.

*Total length 17,5 mm., femur 9,1 mm., tibia 9 mm., tarsus with 4th toe 12,2 mm., humerus 3,9 mm., forearm with longest finger 8,4 mm., nose 2,8 mm., diameter of eye 3,5 mm., breadth of head 6,2 mm.*

## Rappia pusilla Cope.

*Proc. Ac. Philad. 1862, p. 343.*

Three small specimens.

Measurements of the largest specimen:

*Total length 20 mm., femur 10 mm., tibia 10,2 mm., tarsus with 4th toe 14 mm., fore limb 13 mm., nose 3,1 mm., diameter of eye 3 mm., breadth of head 7 mm.*

The specimens seem rather well agree with COPE's description of this species, though the missing of figure makes me somewhat doubtful, whether they are to be referred to it.

In some cases it is very difficult to decide to which species of this confused genus the different individuals are to be counted, most of the numerous species being founded on the different colour as structural character, a difference of very little value as for the frogs. A strict revision of this genus grounded on comparisons between the type-specimens and a sufficient number of individuals from different places seems to be of great need.

## Megalixalus fornasinii Gntr.

Three specimens of the typical appearance. Any »scattered tubercles» cannot be spoken of, which WERNER[1] also remarks as regards his specimens. To the naked eye the skin seems to be quite smooth, but feebly granulated under a magnifying glass.

The lengths of the specimens are 26, 19, and 16 mm. from snout to vent.

## Hylambates rufus Reich.

WERNER: *Verh. zool. bot. Gesellsch. Wien 1898.* Bd. 48, p. 195. PETERS: *Monatsber. Ak. Wissensch. Berlin 1875*, p. 205. pl. 2, fig. 1. *(H. notatus).*

Of 26 specimens belonging to this genus I have ranged 15 under *H. aubryi* A. Dum. and the rest under *H. rufus* Reich. To this latter species I also reckon three specimens which, as far as I am aware, are identical with WERNER's[2] *Hylambates brevirostris*, a form which, I think, cannot maintain its place as a distinct species.

Concerning the character which WERNER seems to consider the chief one, viz. the projecting nose with the nostrils visible underneath, we find it quite distinct in these three

[1] Verh. zool. bot. Gesellsch. Wien 1895. Bd. 48, p. 195.
[2] loc. cit.

specimens, but in a fourth specimen, evidently belonging to the variety *notata* of *H. rufus*, the same state of things appears. WERNER himself also speaks of such an example of the same variety, wherefore this character cannot be counted as a structural one.

Another character, upon which WERNER lays a great stress, should be a different arrangement of the vomerine teeth in the two forms, *H. rufus* and *H. brevirostris*, but such a case does not exist. The groups of vomerine teeth in *H. rufus* vary considerably both in shape and arrangement (curiously enough, WERNER says they do not do so), wherefore in some rufus-specimens these teeth are arranged in quite a similar manner, stated by WERNER as typical for his new species. Moreover, according to him, the head should be broader in *H. brevirostris;* as appears by the table, this is, however, the case only to some extent, since only one example has a broader head than any rufus-specimen; why, one has even the next narrowest head among all measured. As for the differences of colour, in these brevirostris-specimens it completely agrees with that one described by WERNER, but such a colour we find in the typical rufus-specimens as well, and what a stress can we lay on this character so variable in all frogs and especially in this genus?

As seen below, my measurements do not give any specifical differences either. *H. brevirostris*, however, seems to have shorter hind limbs and longer fore limbs than *H. rufus*, but the individual variations are so great that the forms completely merge into each other.

There is a difference, however, at least as for these specimens, the small style, which projects from the point of the mandible, being much longer in the brevirostris-specimens than in the others, which difference clearly depends upon the higher nose of the former. But even if this should prove to be constant, the differences between the two forms are in my thought of too small a value as specifical ones, wherefore I consider it best to range the form *brevirostris* as a variety of the highly variable *H. rufus*.

Of the other eight rufus-specimens, seven seem to belong to the variety *notata*, while the eight has another colour, beside which, as appears from the table, it is separated from the seven by a broader head and considerably longer hind

limbs. The colour above is reddish grey with a triangular dark spot between the eyes, tapering behind to a short narrow stripe, connecting the spot with a broad longitudinal marking of the same colour, which occupies the middle and posterior parts of the back. The light very distinctly granular belly is provided with round dark spots, and the whole hind limb is cross-barred. The skin above is shagreened with small scattered tubercles. An indication of a white spot below the eye. As it seems, the specimen agrees most with the variety *ventrimaculata* Werner.

The other seven evidently belong to the variety *notata*. The smaller examples agree completely with Werner's diagnosis of this form as well as with Peter's figure. The larger, however, are in want of the fine dark reticulations and the white spots on the knees and elbows; but being in other respects quite similar, it is probable they all belong to the same form, and those differences in colour mentioned are to be reckoned as due to the different ages. The bright white spots on the limbs should then be a juvenile character, which well agrees with the circumstance that also the light spot below the eye becomes more indistinct in older specimens. Werner says that the forma *notata* is a »small variety», which indicates he does not consider it to become larger than the small individuals with the white knee- and elbow-spots spoken of above. Thus, it should be a kind of dwarfform of *Hylambates rufus*. In my opinion, there is, however, no reason for such a supposition; it seems to me more probable that it is as I have said above.

The specimens vary in length from 23 to 69 mm. Except the colour, there is no other great differences to be detected between young and old specimens, being instead, as seen by the table, wonderfully equal in the development of the external parts.

## Hylambates aubryi A. Dum.

The length of the specimens (15 in number) varies between 20 and 40 mm. The groundcolour above is whitish, reddish grey or olive, all specimens having a dark triangular spot between the eyes, which with a narrow stripe is connected with a broad dark-coloured marking that occupies the

whole posterior part of the back, the centre of which in most of the specimens is interrupted by an irregular space of the ground-colour. In all the specimens there are on the sides of the body, especially on the sacral region, small round spots, often very distinctly marked. Lower parts uniform and extremities dark-banded.

By the average table below one cannot find out any distinct differences between the development of the external parts of this species and that of *H. rufus* (all specimens of the different varieties of this one measured together).

| | H. aubryi 12 specimens | Hylambates rufus (10 specim.)[1] | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average of all specim. | | var. notata | | | | | | | | Average | var. brevirostris | | | Average | Var. ventrimaculata | | | | | | |
| | | | older 5 sp. | younger 5 sp. | | | | | | | | | | | | | | | | | | | |
| Length of body in mm. | 28.1 | 31.5 | 56 | 23.5 | 25 | 33 | 38 | 59.5 | 69 | | | | 37 | 50 | 52 | | 49.7 | | | | | | |
| Femur[2] | 48.6 | 50.5 | 50.5 | 51 | 47.6 | 54.5 | 47.9 | 52.3 | 52.2 | 50.9 | | | 51.4 | 51.4 | 42.7 | 48.5 | 54.3 | | | | | | |
| Tibia | 50.3 | 50.9 | 48.9 | 51.9 | 52.8 | 51.5 | 49.2 | 50.9 | 48.3 | 50.8 | | | 48.9 | 47.8 | 46.2 | 47.6 | 51.5 | | | | | | |
| Tarsus with 4th toe | 69.5 | 66.9 | 70.6 | 67.2 | 68 | 66.1 | 65.8 | 73.1 | 65.2 | 67.6 | | | 67.6 | 70 | 66.3 | 67.9 | 78.5 | | | | | | |
| Humerus | 18.9 | 19.3 | 19.5 | 18.5 | 20 | 20.6 | 18.2 | 19.2 | 18.5 | 19.2 | | | 19.2 | 20 | 19.2 | 19.5 | 18.9 | | | | | | |
| Forearm | 50.2 | 48.5 | 48.9 | 48.7 | 46.8 | 48.5 | 47.4 | 48.1 | 48.7 | 48 | | | 51.1 | 52.8 | 51.5 | 51.8 | 52.3 | | | | | | |
| Length of nost. | 17.3 | 17.1 | 17.3 | 15.7 | 19.2 | 18.2 | 15.8 | 18 | 17 | 17.3 | | | 16.5 | 16.4 | 17.3 | 16.7 | 17.7 | | | | | | |
| Diameter of eye | 16 | 15.9 | 13.6 | 17 | 17.2 | 15.5 | 14.7 | 13.6 | 11.9 | 15 | | | 15.1 | 14.2 | 13.8 | 14.4 | 14.5 | | | | | | |
| Breadth of head | 37.4 | 38.9 | 39.8 | 39.4 | 39.6 | 39.4 | 38.4 | 39 | 34 | 38.3 | | | 37.8 | 44 | 40.4 | 40.7 | 41.8 | | | | | | |
| Height of tympanum | 7.9 | 7.9 | 7.9 | 8.5 | 8.4 | 8.5 | 7.9 | 7.9 | 8 | 8.2 | | | 7.3 | 8.2 | 5.8 | 7.1 | 8 | | | | | | |

[1] A small notata specimen not measured.
[2] All the measurements in % of length of body.

## Leptodactylodon ovatus L. G. Andersson.

*Pl. I*, fig. *2*, *2 a*.

*Verhandl. d. k. k. zool. bot. Gesellsch. in Wien 1903 p. 141.*

*Ann. Mag. Nat. Hist. (7) Bd. 13. 1904. p. 262.* **Bulua ventrimarmorata** *Boul.*

The description of this new form in paper quoted above is as follows.

»**Leptodactylodon** nov. gen.

Eine neue Gattung, der Familie Ranidæ angehörend.

Pupille horizontal. Zunge herzförmig, hinten deutlich ausgeschnitten. Deutliche und zahlreiche Oberkieferzähne, Unterkiefer zahnlos. Gaumenzähne in zwei quergestellten, geraden und sehr markierten Leisten hinter den weit von einander entfernten Choanen. Tympanum mehr oder weniger verborgen. Finger und Zehen kurz, ohne Schwimmhaut und Haftscheiben. Äussere Metatarsalia innig verbunden, Schwimmhaut oder Rinne zwischen denselben nicht vorhanden. Der Querfortsatz des Sakralwirbels nicht verbreitert. Sternalapparat von firmisternem Typus. Coracoid viel stärker als Præcoracoid. Omosternum mit einem langen, schmalen Stiel. Sternum eine breite, dünne Platte. Endglied der Finger und Zehen von einer dicken Basis aus zugespitzt, etwas gebogen.«

»**Leptodatylodon ovatus** nov. spec.

Kopf breit und flach, mit halbzirkelförmigen Vorderrand. Kein deutlicher Canthus rostralis. Schnauze ein wenig länger als der Augendurchmesser. Augen nach oben gerichtet, klein. Interorbitalraum mehr als dobbelt so breit als das Augenlid. Nasenloch etwas näher dem Auge als der Schnauzenspitze. Finger und Zehen mit sehr deutlichen Subarticulartuberkeln. Das äusserste Glied zugespitzt und gebogen wie eine einfache Klaue. Ein kleiner innerer Metatarsalhöcker, kein äusserer. Erster Finger länger als der zweite und vierte, der dritte am längsten. Dritte Zehe etwas länger als die fünfte. Hintere Extremitäten kurz; das Tarsometatarsalgelenk erreicht die Schnauzenspitze.

Färbung sehr variierend. Oberseite olivenbraun bis rötlich, mit oder ohne dunkle Flecken, Unterseite schwarzbraun

bis rötlichbraun, mit weisser Marmorierung. Oberschenkel des Hinterbeines unten gewöhnlich einfarbig weiss, bisweilen auch wie zumeist die Unterschenkel mit dunklen Flecken, beide oben mit oder ohne Querbänder.

Eine sehr deutliche Falte vom Auge zum Schulter und eine andere oberhalb des Anus. Haut glatt, Schnauze und Interorbitalraum mit sehr kleinen punktförmigen Erhebungen.

Die folgenden Masse beziehen sich auf das grösste, kleinste und ein mittelgrosses Individuum.

| | mm. | mm. | mm. |
|---|---|---|---|
| Körperlänge (Schnauze bis Spitze des Steissbeines) | 38 | 28.6 | 23 |
| Femur (Anus bis Kniegelenk) | 16 | 12.8 | 10.2 |
| Tibia | 16.8 | 12.8 | 10.2 |
| Tarsus | 9.8 | 7 | 5.8 |
| Fuss mit vierter Zehe | 17 | 13 | 10 |
| Humerus | 6.4 | 5.2 | 4.4 |
| Unterarm und Hand | 15.3 | 12.3 | 9.1 |
| Schnauze | 5.3 | 4.1 | 3.9 |
| Länge des Auges | 4.1 | 3 | 3 |
| Kopfbreite in der Tympanalgegend | 16.5 | 11.7 | 10 |

Im Habitus ist dieser Frosch durch die kurzen Extremitäten und den dicken Körper dem genus Callina ähnlich, aber die horizontale Pupille und die Anordnung der Gaumenzähne sind von dieser Gattung sehr abweichend. Dieselben Charaktere und die Bildung des Endgliedes der Zehen unterscheiden sie auch gut von Hylambates und es scheint mir, als ob sie mit keiner bisher beschriebenen Gattung der Famile *Ranidæ* übereinstimmte.»

To what is said in this diagnosis I will only add that the colour of the angle between the thighs and the sides of body is black or darkbrown with bright white great markings. Of the ten specimens 8 are females and 2 males, the latter recognized by their inner vocal sacs, with oval slits opening behind on the inner sides of the lower jaw. In one of the males the upper side of the thumb is furnished with two groups small horny spines. In other respects there are no differences between the sexes.

## Didynamipus sjöstedti L. G. Andersson.

Pl. I, fig. 3, 3a—3d.

*Verh. d. k. k. zool. bot. Gesellsch. Wien. 1903 p. 143 (vorläuf. Mitteil.).*

I repeat the description given in the paper quoted above.

»**Didynamipus** nov. gen.

Eine neue Gattung der Familie *Eugysstomatidæ* angehörend.

Pupille länglich-oval. Zunge elliptisch, schmal, hinten frei, nicht eingeschnitten. Kiefer und Gaumen zahnlos. Tympanum versteckt. Finger und Zehen ohne Schwimmhaut und Haftscheiben. Schwimmhaut oder Rinne zwischen den äusseren Metatarsalia nicht vorhanden. Nur vier Zehen. Äussere und innere Finger und Zehen sehr klein, nur mit einem ganz reduzierten Glied. Haut ohne Knochenschild. Der Querfortsatz des Sakralwirbels dünn und breit. Coracoideum und Praecoracoideum gleich entwickelt, parallel. Omosternum fehlt, Sternum ein kleiner, knorpeliger Fortsatz.

**Didynamipus sjöstedti** nov. spec.

Kopf breit, abgeplattet, dreieckig, mit scharfem Canthus rostralis. Schnauze so lang als der Augendurchmesser. Augen seitlich, Interorbitalraum viel breiter als das Augenlid. Nasenloch unterhalb des Canthus rostralis, der Schnauzenspitze ein wenig näher als dem Auge. Finger und Zehen vier; die äusseren und inneren sehr klein, wie kleine Stummeln aus der Haut hervortretend, aber alle von aussen bemerkbar. Erster und vierter Finger nur mit einem sehr kleinen Endglied, auf einem kurzen und sehr schmalen Metacarpale sitzend. Erstes Metacarpale etwas kürzer als das vierte. Dritter Finger am längsten, doppelt so lang als der zweite, mit drei Gliedern; der zweite mit zwei Gliedern. Mittlere Metacarpalia doppelt so kräftig als die äusseren. Von den Zehen ist die erste (innere) rudimentär, nur durch einen kleinen Knochen an der Basis des zweiten Metatarsale repräsentiert. Zweite Zehe mit einem Glied, dritte mit zwei Gliedern, vierte mit vier und fünfte mit einem. Vierte Zehe fast dreimal so lang als die dritte und diese ebensoviel länger als die zweite und fünfte. Fünfte Metatarsale und Zehe sehr schmal, doppelt so schmal als die übrigen Metatarsalia, erinnert an die äussere reduzierte

Zehe bei Huftieren oder einigen Beuteltieren. Keine deutlichen Subarticularhöcker, aber ein rundlicher äusserer Metatarsaltuberkel. Das Tibiotarsalgelenk erreicht das Auge. Haut sehr fein chagriniert. Unter dem After ein dreieckiges Feld mit flachen warzenartigen Erhebungen.

Oben gelblichbraun mit kleinen dunkleren Flecken, unten weisslich. Ein schwarzer Streifen vom Auge zur Schnauzenspitze unter dem Canthus rostralis.

Zwei Exemplare (Dr. Y. Sjöstedt).

| | mm. | mm. |
|---|---|---|
| Körperlänge | 18 | 15 |
| Femur | 7 | 6.2 |
| Tibia | 7.8 | 6.8 |
| Tarsus | 5 | 4.6 |
| Fuss mit vierter Zehe | 6 | 5 |
| Humerus | 4.3 | 4 |
| Unterarm mit Hand | 8.2 | 7.1 |
| Schnauze | 3 | 2.7 |
| Kopfbreite hinter den Augen | 5.8 | 4.8 |

## Nectophryne afra Peters.

Peters. *Monatsber. Berl. Acad.* 1875 p. 202, pl. II. f. 5.
Boulenger. *Proc. Zool. Soc. London.* 1890 p. 436, fig. 1.

6 specimens, varying in length between 17 and 24 mm. from snout to vent.

The coloration is rather variable. The ground-colour in these examples, kept in spirit, is white, brown or light red with dark markings. Four of the specimens correspond with Peter's figure, but in the two others the whole back is dark, apart from three light cross-bands in the one, viz. one between the eyes, one angle-shaped behind the eyes and a third crossing the middle part of the back (an indication of a fourth is also to be seen on the sacral region); in the other we find instead of these bands some irregular dots of the reddish light ground-colour.

The subdigital lamellæ, figured by Boulenger, are very distinct. On the fingers their number agrees with that in

the figure cited, viz. 3, 5, 3, 2 or usually but 1, on respectively 4th to 1st finger, the somewhat swollen tip not counted, but on the foot they are not so many as drawn by BOULENGER. Without the tip they are in these specimens 4, 6, 4, 2, 1 on 5th to 1st toe, while in the figure we see 6, 8, 6 (5?), 3, 2. In a few exceptional cases we do not find any distinct limits in the basal lamella, but usually the number given above is easily distinguished and certainly in no case too great.

## Bufo benguelensis Boul.

BOULENGER. *Cat. Batr. sal. p. 299. Pl. 19, fig. 3.*

16 specimens, from 19,2 mm. to 35,5 mm. between snout and vent.

The colour varies considerably. In all specimens except the smallest one, there is a broad light interorbital cross-band, and in some we find a narrow light median stripe on the back, which also sometimes is ornamented with large dark and light spots biserally arranged. Sometimes the whole back is uniform dark-coloured as in the specimen figured by BOULENGER.

## Bufo superciliaris Boul.

BOULENGER. *Proc. Zool. Soc. 1887, p. 565 and 1900 p. 436.*

WERNER. *Sitzber. Akad. Wissensch. München 1897, p. 212* (B. lævissimus).

WERNER. *Verhandl. k. k. zool. bot. Gesellsch. Wien 1898, p. 202, pl. II, fig. 1.*

Not less than 19 specimens of this beautiful frog are to found in this collection, varying in length between 26 and 138 mm. from nose to vent. All sizes thus being represented, I have been able to examine the external variations of the species depending on different ages, which examination may be of a certain interest also because the young and adult ones have to some degree been described as distinct species. BOULENGER's type-specimens for *B. superciliaris* were small specimens, while WERNER had at least one large example

(104 mm.) as type for his *B. lævissimus*. By this a difference stated by WERNER might be explained at once, viz. the different size of the paratoids. According to BOULENGER the length of those is equal with their distance from the nostrils, while WERNER states them to be considerably longer. As seen by the table below, the paratoids considerably increase in length with age; therefore it can be that both BOULENGER'S and WERNER'S descriptions correspond with the case in this same species, that of the former with the young, the latter with the older ones.

Another difference between *superciliaris* and *lævissimus* according to WERNER should be the totally want of dorsolateral folds in the latter. Among the specimens present, there are some examples with distinct folds, some without, this however not being any difference due to age, since in the largest example we do not find any folds at all, whereas in the next largest they appear to be very distinct. In the specimen in size after that (100 mm.), there is on one side a distinct glandular fold, which is totally absent on the other side. A similar variation exists in the smaller specimens as well. Nor can it be a sexual difference, all the three large specimens mentioned being females.

More difficult to explaine is why the hind limbs in WERNER'S specimens should be shorter than in those of BOULENGER, as these limbs, as appears by the table, exceedingly increase in length with age. This increase, however, is limited only to the thighs and the calves, but does not exist in the tarsus and the foot, which during the whole life keep to the same relative length.

As to other parts of the body, the fore limbs do not show any variations in length in the different ages. The nose as well as the horizontal diameter of the eye grow shorter with age but to very different degree, the decrease of the former measurement being rather small, that of the latter very much greater, wherefore the nose, which in the youngest specimens is shorter than the diameter of eye, becomes the longest with age, both measurements being about equal in middle-sized specimens.

The paratoid glands (counted to the hind margin of the eye) are in the small specimens rather more than a fourth of the length of body, but in the large ones more than a third

of the same length. Furthermore, the paratoids, being in the young ones nearly parallel become in older examples very distinctly convergent in front.

The variations in colour due to different ages seem to be very small if any at all. Possibly, there is a tendency to reduce the dark great dorsal spots, all the three full-grown specimens being in want of such spots between the eyes and not having more than two on the back. In most of the others we find two livercoloured spots on the interorbital region and beside those four equal ones on the back, although even in these one or another pair may be vanished. In one of the largest and one of the smallest specimens there is an indication only of one of these spots, the whole upper side being uniform.

WERNER says that the large specimens should be in want of the usual dark crossbands on thighs and calves, but in all the three large specimens in this collection we find them very distinct.

**Average-table.**

| | (3 specimens 138—100 mm.) | (8 specimens 63—40 mm.) | (5 specimens 37– 26 mm.) |
|---|---|---|---|
| Length of body in mm. . . . . | 116.7 | 52 | 32.1 |
| » femur in % of that of body | 43.4 | 38.6 | 36.9 |
| » tibia » » | 40.5 | 37.6 | 36.3 |
| » tarsus with 4th toe » | 56.7 | 54.9 | 56.6 |
| » humerus in % » | 22.1 | 23.1 | 22.5 |
| » forearm with hand » | 46.9 | 46.6 | 46.9 |
| » nose in % » | 13.6 | 14.2 | 14.4 |
| » eye » » | 11.7 | 14.2 | 15.6 |
| » paratoids[1] in % » | 34.3 | 29 | 27.3 |
| Breadth between the front parts of paratoids in % of that of body | 28.6 | 31.3 | 34.2 |
| Breadth between the posterior parts of paratoids in % of that of body | 58 | 49.7 | 45 |

[1] The length of the paratoids is counted from their hind margin to the eye.

## Xenopus.

Of this genus there are 21 individuals, of which 20 belong to the species *mülleri* Ptrs and one to the species *calcaratus* Ptrs, the latter distinguished by its very small eyes and the short tentacle below the eye. Besides, the species *calcaratus* seems to have shorter extremities than *mülleri* as shown by the table below.

| | X. calcaratus | X. mülleri |
|---|---|---|
| Length of body in mm. . . . . | 24 | 24 |
| » of femur in % of that of body . . . . | 9.1 | 10.8 |
| » of calf with tarsus and foot in % of that of body . . . . . | 22.5 | 25 |
| » of fore limbs in % of that of body . . | 11 | 12 |

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